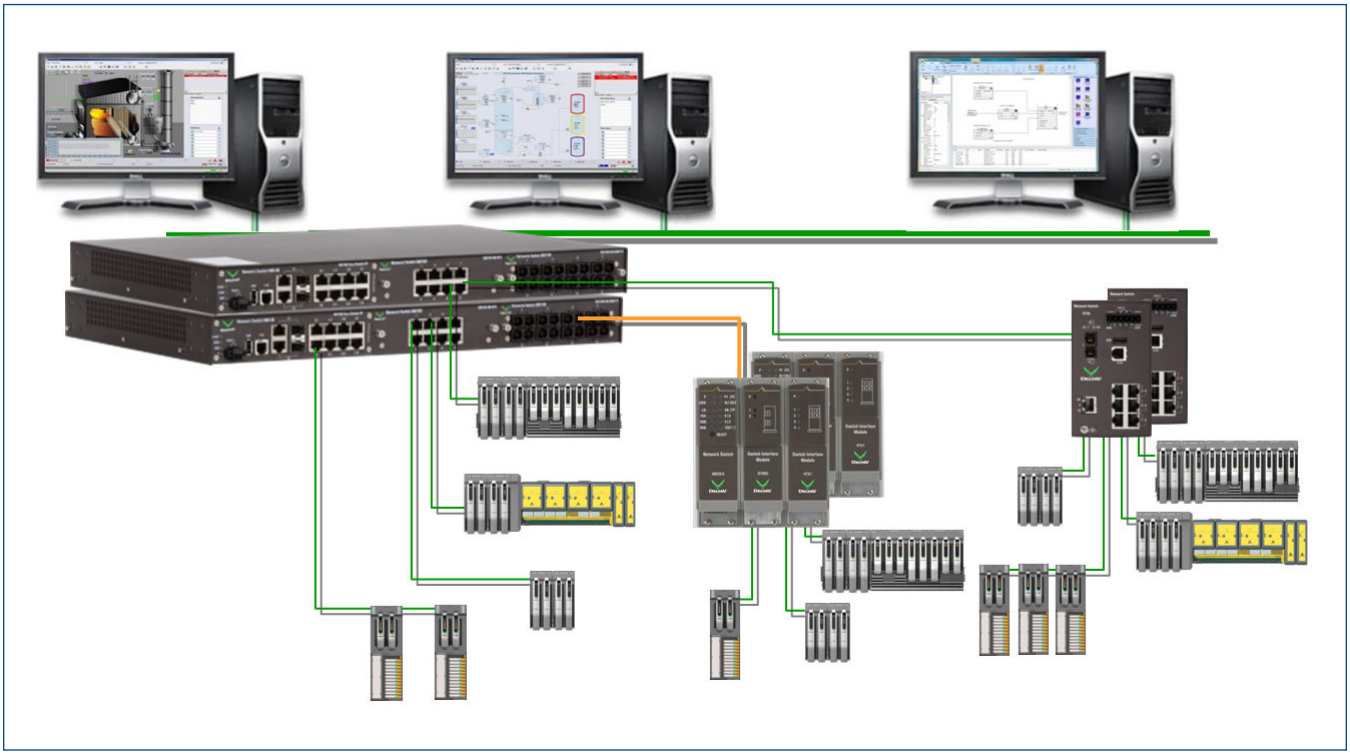
DeltaV™ Control Network Hardware



The DeltaV™ Control Network is easy to install and maintain with the new DeltaV Smart Switches

- Easy to use
- Scalable and cost-effective
- Built-in network diagnostics
- Fully Redundant Network

Introduction

Your control network is the backbone of your system. The DeltaV™ Control Network (DCN) is a standard Ethernet network dedicated to the DeltaV system. You connect the DeltaV workstations and the controllers using the Control Network.

The Control Network is a dual speed 10/100BaseT network. CAT 5 screened (ScTP) twisted-pair cable connects each node to the hub or switch.

The DeltaV Control Network is an easy to design and implement dedicated Ethernet network. All DeltaV devices are connected to the same subnet and all of the network addressing (IP addresses) for DeltaV equipment is managed by the DeltaV system. The DeltaV "self-managed network" does not require the user to track network address usage.

The DeltaV system supports a specific set of network switches for the DeltaV Control Network and the DeltaV Smart Switches (see the ordering information included in this document for details of the specific control network devices we support and the DeltaV Smart Switches).

Benefits

Easy to design and implement. As a dedicated network with predictable communications traffic DeltaV has done all of the system testing so you only have to plug the components together to create the control network.

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Plug-and-play components. You can expand the network easily: just plug in another workstation or controller and it is recognized by the system.

Standards compliance. Network components are compliant with standards such as IEEE, CE and CSA.

Network diagnostics. On the Smart Switches you can use software diagnostics to verify proper communication-line health. The LEDs on each individual switch provide health status information.

Scalable in small increments. The DeltaV system provides a package with very low initial cost. You are able to expand the system readily and economically by adding hardware incrementally to your system.

Redundant. The DeltaV Control Network is a fully redundant communication network. Nodes may also be connected using a simplex network, but this is not a recommended practice.

DeltaV Control Network Description and Specification

The DeltaV Control Network can be physically connected as a star or cascade (daisy-chain) topology. Other network configurations are possible, such as a combination of a star and cascade topology. (DeltaV does not support network ring topologies).

Refer to the latest DeltaV system installation and planning manual(s) for details of network layouts and network cable shielding requirements and power and grounding requirements for the overall DeltaV distributed control system.

The Control Network can use one or more Ethernet switches for communications connections. ***To be supported by Emerson Process Management, the DeltaV control network must be installed using the network equipment listed in this document.***

Wiring

The maximum twisted-pair cable length for the DeltaV control network for any Ethernet-connected device is 100 meters (328 feet). If longer cable distances are needed for this workstation-to-switch, controller-to-switch, or switch-to-switch connections, there are various fiber-optic cable and transceiver solutions available from Emerson Process Management as a standard supported solution. For special network designs that go beyond the supported diagrams shown in the DeltaV installation and planning manuals, consult with the Emerson Process Management SureService team.

The DeltaV Control Network supports the use of auto-negotiated 10-half, 100-half, 10 full, and 100-full duplex communications where the industry standard auto-negotiation process determines the highest speed at which two devices will communicate with each other. The latest DeltaV network products make use of gigabit Ethernet for switch-to-switch communications and can support distances up to 108 Km using standard product fiber optic communications.

The DeltaV workstations and controllers contain two Ethernet ports to provide the recommended redundant communications. Early models of DeltaV controllers supported 10 megabit Ethernet at half-duplex only. The latest DeltaV controllers auto-negotiate to any speed and duplex from 10-half to 100-full, depending on what the controller is attached to. The workstations do the same: they auto-negotiate to the highest speed and duplex available from their attached device.

Ethernet Cable

The DeltaV system requires the use of Category 5e screened (ScTP) cable for the 10/100/1000 BaseT/TX control network.

Fiber-optic Wiring

Because fiber-optic cables do not conduct electricity, they should be used in connections between buildings or in plant areas where electromagnetic interference is present.

Fiber-optic cabling should also be used where wire runs are longer than 100 meters (328 ft).

DeltaV Smart Switches

DeltaV Smart Switch

The DeltaV Network “Smart” switches are the next generation in the use of commercial off-the-shelf (COTS) components in control systems. Called “Built-for-purpose” commercial off the shelf these switches combine the lower cost of off-the-shelf components with DeltaV specific software and features to make them more integrated and plug-and-play in the control network.

DeltaV Smart Switches require no configuration to function in the DeltaV network. Accessing the advanced features takes only minor configuration that is easy to perform using the DeltaV Smart Switch Command Center and secured so you can’t incorrectly configure any switching functions that impact the performance of the DeltaV system.

The built-for-purpose switch also allows the DeltaV system to provide an auto port lockdown advanced security feature that is easy for a control system user to implement: an increasingly important product feature in today's hostile environment.

The Smart Switch will generate network, device and security alarms to operator workstations. The built-in network and switch diagnostics provide network and switch diagnostic information to the Smart Switch Command Center without the use of third party SNMP applications.

Please see the PDS ***"DeltaV Network Smart Switches"*** *for complete ordering information and detailed specifications of the DeltaV Smart Switches.*

DeltaV Smart Switches are the preferred switch to be used within the DeltaV network.

The DeltaV Smart Switch provides a full family of built for purpose switches that are easy to use and peovide advnaced security features to help protect your DeltaV networkfrom cyber incidents

Ordering Information

DIN Rail Mount Fixed Port Smart Switches

Ordering Number	Description All FP20 Switches have 8 total ports
VE6041F01C1	Smart 6-Port (RJ45) 10/100BASE-TX Switch with two RJ45 10/100BASE-TX Uplink Ports (FP20-6TX2TX)
VE6041F02C1	Smart 6-Port (RJ45) 10/100BASE-TX Switch with two Uplink Ports -- one RJ45 10/100BASE-TX and one SC 100BASE-FX Multimode (FP20-6TX1MM1TX)
VE6041F03C1	Smart 6-Port (RJ45) 10/100BASE-TX Switch with two Uplink Ports -- one RJ45 10/100BASE-TX and one SC 100BASE-FX Single Mode (FP20-6TX1SM1TX)
VE6041F04C1	Smart 6-Port (RJ45) 10/100BASE-TX Switch with two Uplink Ports – one RJ45 10/100BASE-TX and one SC 100BASE-FX Single Mode, Long Haul (FP20-6TX1SMLH1TX)
VE6041F05C1	Smart 6-Port (RJ45) 10/100BASE-TX Switch with two SC 100BASE-FX Multimode Uplink Ports (FP20-6TX2MM)
VE6041F06C1	Smart 6-Port (RJ45) 10/100BASE-TX Switch with two SC 100BASE-FX Single Mode Uplink Ports (FP20-6TX2SM)
VE6041F07C1	Smart 6-Port (RJ45) 10/100BASE-TX Switch with two SC 100BASE-FX Single Mode, Long Haul Uplink Ports (FP20-6TX2SMLH)

Ordering Number	Description
VE6042S2C1	Smart Ethernet Switch Module and Backplane for two VE6045-series Media Modules (MD20-8)
VE6042S4C1	Smart Ethernet Switch Module and Backplane for four VE6045-series Media Modules (MD20-16)
VE6042S6C1	Smart Ethernet Switch Module and Backplane for six VE6045-series Media Modules (MD20-24)
VE6043S2C1	Smart Switch Module, Gigabit Uplink Module, and Backplane for two VE6045-series Media Modules (MD30-8 + MD4-2TX/SFP)
VE6043S4C1	Smart Switch Module, Gigabit Uplink Module, and Backplane for four VE6045-series Media Modules (MD30-16 + MD4-2TX/SFP)
VE6043S6C1	Smart Switch Module, Gigabit Uplink Module, and Backplane for six VE6045-series Media Modules (MD30-24 + MD4-2TX/SFP)

Interface modules to populate the VE6042 and VE6043 Switches

	Description Media Modules below can be used on any of the MD series switches above
VE6045M01C1	Smart 2-Port Media Module; Two 100BASE-FX Fiber-Optic Multi-Mode SC Ports (MD2-2FXM2)
VE6045M02C1	Smart 2-Port Media Module; Two 100BASE-FX Fiber-Optic Single Mode SC Ports (MD2-2FXS2)
VE6045M03C1	Smart 4-Port Media Module; Four 10/100BASE-TX Copper RJ45 Ports (MD2-4TX1)
VE6045M04C1	Smart 4-Port Media Module; Two 10/100BASE-TX Copper RJ45 Ports, and two 100BASE-FX Fiber-Optic Multi-Mode SC Ports (MD3-2FXM2/2TX1)
VE6045M05C1	Smart Switch; 4-Port Media Module; Two 10/100BASE-TX Copper RJ45 Ports, and two 100BASE-FX Fiber-Optic Single Mode SC Ports (MD3-2FXS2/2TX1)
VE6045M06C1	Smart 4-Port Media Module; Four 100BASE-FX Fiber-Optic Multi-Mode SC Ports (MD3-4FX/M2)
VE6045M07C1	Smart 4-Port Media Module; Four 100BASE-FX Fiber-Optic Multi-Mode ST Ports (MD3-4FX/M4)
VE6045M08C1	Smart 4-Port Media Module; Four 100BASE-FX Fiber-Optic Single-Mode SC Ports(MD3-4FXS2)
VE6045M09C1	Smart 4-Port Media Module; Two 10/100BASE-TX Copper RJ45 Ports, and two 100BASE-FX Fiber-Optic Multi-Mode ST Ports (MD3-2FXM4/2TX1)
VE6045M10C1	Smart 4-Port Media Module; Three 10/100BASE-TX Copper RJ45 Ports, and one 100BASE-FX Fiber-Optic Single Mode SC Ports (MD3-1FXS2/3TX1)
VE6045M11C1	Smart 4-Port Power-over-Ethernet (PoE) Media Module; All Ports are 10/100BASE-TX Copper RJ45 (MD2-4TX1-PoE)

*All of the **VE6041, VE6042, VE6043** and **VE6045** Smart Switches above are also available in Extend Specification versions for use in more rugged environments. See "PDS DeltaV Smart Switches" for details and ordering information.*

Rack Mount Smart Switches

8 and 24 Port non-Modular Rack Mount Switch

Switch VE Number	Description
The VE6046 and VE6047 are fixed 8 or 24 port copper switches	
VE6046P1 thru P4	Smart 24-Port Switch; Each port is 10/100BASE-TX Copper RJ45; Includes two RJ45 Uplink ports and two slots for VE6050-series Transceiver Modules Power Cord (RM100-24TX) (This switch is not modular)
VE6047P1 thru P4	Smart 8-Port Switch; Each port is 10/100BASE-TX Copper RJ45; Includes two RJ45 Uplink ports and two slots for VE6050-series Transceiver Modules Power Cord (RM100-8TX) (This switch is not modular)

24 Port Modular Rack Mount Switch

Switch VE Number	Description
The VE6048 switch is a base chassis with 8 fixed copper ports and 2 gigabit uplink ports	
VE6048R1P1 thru P4	Smart 8-Port Switch; Each port is 10/100BASE-TX Copper RJ45; Includes two RJ45 Uplink ports and two slots for VE6050-series Transceiver Modules Includes two expansion bays to add ports; Simplex Power Supply; Power Cord (RM100-Base Module)
VE6048R2P1 Redundant Power Supplies	Smart 8-Port Switch; Each port is 10/100BASE-TX Copper RJ45; Includes two RJ45 Uplink ports and two slots for VE6050-series Transceiver Modules; Includes two expansion bays to add ports; Redundant Power Supply; Power Cords (RM100-RP Base Module)

8 Port Interface Modules to Customize the VE6048 Switch

Switch VE Number	Description
The VE6049 modules are installed in the VE6048 to create the specific switch configuration required	
VE6049M01	8-Port Expansion Module for VE6048-series Smart Switches; Each Port is 10/100BASE-TX Copper RJ45 (RM100-EM8TX)
VE6049M02	8-Port Expansion Module for VE6048-series Smart Switches; Each Port is 100BASE-FX Fiber-Optic Multi-Mode SC (RM100-EM8MMFX)

VE6049M03	8-Port Expansion Module for VE6048-series Smart Switches; Each Port is 100BASE-FX Fiber-Optic Single-Mode SC (RM100-EM8SMFX)
VE6049M04	8-Slot Expansion Module for VE6048-series Smart Switches. The slots can have any combination of VE6050-series 100Mb Transceivers installed in them. (RM100-EM8SFP)

The following transceivers are used in the VE6043, VE6046, VE6047 and VE6048 switches.

	Fiber Optic SFP Transceivers for use in DeltaV Switches Description
VE6050T01	Transciever for Smart Switches: 1 Gigabit Ethernet; Single Mode Long Haul, for up to 120 Kilometers of fiber-optic cable (M-SFP-LH+/LC) [This SFP Module is NOT compatible with Extended Spec usage – not available with extended temperature specifications
VE6050T02	Transciever for Smart Switches; 1 Gigabit Ethernet; Single Mode Long Haul, for up to 80 Kilometers of fiber-optic cable (M-SFP-LH/LC-EEC)
VE6050T03	Transciever for Smart Switches; 1 Gigabit Ethernet; Single Mode, for up to 20 Kilometers of fiber-optic cable (M-SFP-LX/LC EEC)
VE6050T04	Transciever for Smart Switches; 100 Megabit Ethernet, Single Mode, for up to 100 Kilometers of fiber-optic cable (M-FAST SFP-LH/LC-EEC)
VE6050T05	Transciever for Smart Switches; 100 Megabit Ethernet; Single Mode, for up to 65 Kilometers of fiber-optic cable (M-FAST SFP-SM+/LC-EEC)
VE6050T06	Transciever for Smart Switches; 100 Megabit Ethernet; Single Mode, for up to 25 Kilometers of fiber-optic cable (M-FAST SFP-SM/LC-EEC)
VE6050T07	Transciever for Smart Switches; 1 Gigabit Ethernet; Multi-mode, for up to 550 meters of fiber-optic cable (M-SFP-SX/LC EEC)
VE6050T08	Transciever for Smart Switches; 100 Megabit Ethernet: Multi-Mode; for up to 5 Kilometers of fiber-optic cable (M-FAST SFP-MM/LC-EEC)

The switches below are unmanaged switches for use in smaller DeltaV systems where the features of the smart switch may not be required

Unmanaged DIN Rail Mount Switches

The Emerson Fiber-optic to Copper Ethernet switches are suitable for use in Class 1 Div. 2 and Class 1 Zone 2 areas to provide an energy-limited fiber-optic link to IS-classed areas. They can also be used as unmanaged switches on the DeltaV communications network for connections between controllers and DeltaV workstations.

Note: These switches should not be used in networks between the controller and CIOC. The DeltaV Smart Switch must be used in the network between the controllers and CIOC.

	VE6019 Fiber-optic (1) to Copper (4) Ethernet Switch
Description	**Specifications**
Ports	4 x10/100BASE-TX, Twisted-pair ports, RJ45 connector, auto-crossing, auto-negotiation 1 x 100BASE –FX, Multi-mode port, MT-RJ connector
Power	Operating voltage 24VDC (18 to 32VDC) Current consumption 250 mA max @ 24 VDC Redundant power connections
Cabling	Twisted pair (TP) 0-100 m Fiber Type: micron muiltmode fiber (MM) 62.5/125 or 50/125 µm 0-2000m Attenuation: ≤11dB (62.5/125), ≤8 dB (50/125)
Front Panel LEDs	Power, link status, collision/duplex and speed
Environmental	Operating temp -40 to +70°C Storage Temp -40 to +85°C ISA 74.04 G3 Airborne contaminates
Dimensions (WxHxD)	35mm x 100mm x 114mm Mounting DIN rail 35MM
Weight	206g
Protection Class	IP20
EMC	EN 61326 with Class A emissions, Annex A immunity
Safety	CSA-C22.2 No 1010.1-92
ATEX	EN 60079-15 Zone 2, fiber port IS EEx nA [op is] IIC T4 IEC 60079-28 (Protection of equipment and transmission systems using optical radiation)
FM	3611 Class1 Div2, Class 1 Zone 2
NAMUR	NE21

VE6020 Fiber-optic (4) to Copper (1) Ethernet Switch	
Description	**Specifications**
Ports	4 x100BASE-FX, Multi-mode ports, MT-RJ connector 1 x 10/100BASE–TX, Twisted-pair port, RJ45 connector, auto-crossing, auto-negotiation
Power	Operating voltage 24VDC (18 to 32VDC) Current consumption 350 mA max @ 24 VDC Redundant power connections
Cabling	Twisted pair (TP) 0-100 m Fiber Type: micron muiltmode fiber (MM) 62.5/125 or 50/125 µm 0-2000m Attenuation: ≤11dB (62.5/125), ≤8 dB (50/125)
Front Panel LEDs	Power, link status, collision/duplex and speed
Environmental	Operating temp -40 to +70°C Storage Temp -40 to +85°C ISA 74.04 G3 Airborne contaminates
Dimensions (WxHxD)	52.5mm x 100mm x 114mm Mounting DIN rail 35MM
Weight	227g
Protection Class	IP20
EMC	EN 61326 with Class A emissions, Annex A immunity
Safety	CSA-C22.2 No 1010.1-92
ATEX	EN 60079-15 Zone 2, fiber port IS EEx nA [op is] IIC T4 Iec 60079-28(Protection Of Equipment And Transmission Systems Using Optical Radiation)
FM	3611 Class1 Div2, Class 1 Zone 2
NAMUR	NE21

Unmanaged Rack Mount Switches

(For detailed technical information please see **www.alliedtelesyn.com**). These units include a rack mount kit and can be installed on 19" rack rails.

When ordering, please make sure to use the model number for destination country. The appropriate electrical connectors will be selected for compatibility with local power requirements.

Note: These switches should not be used in networks between the controller and CIOC. The DeltaV Smart Switch must be used in the network between the controllers and CIOC.

Description	Model Number
8-Port 10/100BASE-TX Ethernet Switch Allied Telesyn AT-FS708 switch	VE6017F0P1 North American power cord VE6017F0P2 United Kingdom power cord VE6017F0P3 European power cord VE6017F0P4 Australian power cord
8-Port 10/100BASE-TX Ethernet Switch (with 100BASE-FX port supports up to 2KM fiber.) Allied Telesyn AT-FS 709FC	VE6017F1P1 North American power cord VE6017F1P2 United Kingdom power cord VE6017F1P3 European power cord VE6017F1P4 Australian power cord

Cisco Switches

With the introduction of the DeltaV Smart Switches, the Emerson branded smart switches are the preferred switch for use in the DeltaV network. As such the Cisco switch information is no longer included in this document as they are no longer quoted on new DeltaV Systems.

Cisco switches continue to be supported for use as spares for existing switches, for system expansion where compatibility with existing switches is desired. Cisco switches and DeltaV Smart Switches can be mixed on a DeltaV system. DeltaV Smart Switch can be used in some cases to replace existing Cisco switches. For further information on this topic please see the whitepaper "DeltaV Smart Switches Displace Cisco Switches"

Product information on the Cisco Switches available for use in a DeltaV System can be obtained from your local DeltaV sales office.

Related Products

- **PDS DeltaV Smart Switch.** For more information on the Smart Switches
- **PDS DeltaV Controller Firewall.** For information on advanced security solutions for DeltaV networks
- **DeltaV Security Manual.** For information on designing a secure DeltaV network
- **WP DeltaV Smart Switch Displace Cisco Switches.** For information on Cisco support

Emerson Process Management

Asia Pacific: 65.6777.8211
Europe, Middle East: 41.41.768.6111
North America, Latin America:
+1 800.833.8314 or
+1 512.832.3774
www.EmersonProcess.com/DeltaV

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